



Co-funded by the
Erasmus+ Programme
of the European Union

ERASMUS +

HIGHER EDUCATION CAPACITY BUILDING

Erasmus+ Project

**New and Innovative Courses for Precision Agriculture
(NICOPA)**

**Invitation to Tender for Equipment Procurement - PAL-Set
(Kazakhstan)**

#NICOPA/12.08/2020/KZ

Prepared by:

EXOLAUNCH GmbH

Address: Reuchlin Str. 10, 10553 Berlin,
Germany

Email: info@ecm-academy.de

Website:

<https://ecm-academy.de/index.php/en/>

Dear Sir/Madam,

We kindly invite you to submit your **tender for the supply of Equipment to the project partner universities in Kazakhstan** (see the technical specifications provided in the Part-III of the main document) within the framework of the Project “*New and Innovative Courses for Precision Agriculture*”- (NICOPA), co-funded by the **ERASMUS+ Programme of the European Union**.

When preparing your tender, please be guided by the invitation to tender.

Please note that partial delivery of equipment for PAL-Set is possible. You can submit commercial offers for selected items from the PAL-Set.

Tenders should be submitted in English **by email to** info@ecm-academy.denot later than **Wednesday, September 9, 2020 at 17:00 (Berlin local time)**.

We kindly ask you to ensure that the tender is signed, stamped and in the **PDF** format. An acknowledgement of receipt will be sent to you accordingly.

In all cases, please add the below reference: #NICOPA/12.08/2020/KZ “Invitation to Tender for Equipment Procurement - PAL-Set (Kazakhstan)”.

*For any additional information, please, contact us **only** by email.*

Sincerely yours,

EXOLAUNCH GmbH

Contents

Annex 1: Company Information Sheet..... 4
Annex 2: Equipment Description..... 5
Annex 3: Commercial Offer 13

Annex 1: Company Information Sheet

#NICOPA/12.08/2020/KZ “Invitation to Tender for Equipment Procurement - PAL-Set (Kazakhstan)”

Please, fill in all fields.

Bidders Information	
Company legal name	
Company legal address	
Company website	
Company e-mail	
Company authorized representative (name, address, telephone number(s), fax number(s) and e-mail address)	
Attached are copies of the following documents:	
<input type="checkbox"/> A photocopy of the trade name registration papers	

Annex 2: Equipment Description

#NICOPA/12.08/2020/KZ “Invitation to Tender for Equipment Procurement - PAL-Set (Kazakhstan)”

Please, fill in all fields.

PAL-Set: //The table of equipment required		
#	Required Technical Specifications and Standards	Quantity
#PAL1	Wireless solar panel and battery powered data logger	1 pc
1	Durable and flexible data logger for all climatic conditions, powered by rechargeable batteries and a solar panel. The logger is equipped with: <ul style="list-style-type: none"> - rain gauge - global radiation sensor - combined air temperature and relative humidity sensor - wind speed sensor 	
2	Sensors layout: <ul style="list-style-type: none"> - 5 digital inputs: automatic sensor recognition, supporting sensor chains (max. 600 sensors) 	
3	Extension connector: Radio access point or Sentek Drill & Drop or ultrasonic wind sensor or two extra chain connectors – Pessl Instruments bus cable nodes	
4	Memory: 8 MB flash memory	
5	Internet connectivity: GPRS, HSDPA, UMTS, WiFi, LTE class 1, LTE class M (Q2/2020)	
6	Alert: SMS, user configurable via website	
7	Dimensions without sensors: 41 cm L x 13 cm W x 7 cm H	
8	Weight without sensors: 2.2 kg	
9	Measuring interval: 5 minutes (by default)	
10	Logging interval: 10-120 min (user selectable)	
11	Transmission frequency: User selectable	
12	Battery: 6V, 4.5AH, Operating range: -35 °C to 80 °C	
13	Solar panel: Dimensions: 13.5 x 13.5 cm, 2-Watt solar panel	
14	Rain gauge - The mechanic consists of a magnet, which moves past a reed switch and opens or closes the circuit.	

	<p>water due to a very fast switching mechanics. The resolution with a surface of 200 cm² is 0.2 mm</p> <p>Sensor Type Double tipping bucket rain gauge</p> <p>Output Switch signal</p> <p>Switch Reed contact, solid state</p> <p>Sensitivity 1 tip per 0.2 mm or 1 tip per 0.5 mm</p> <p>Collector Surface 200 cm²</p> <p>Evaluation Digital</p> <p>Maximum Rain 12 mm/minute</p> <p>Dimensions 185 mm diameter x 250 mm H</p> <p>Accuracy ±5%</p>	
15	<p>Global radiation sensor - The IM506D Pyranometer is designed for field measurements of global solar radiation in agricultural, meteorological and solar energy studies. In clear, unobstructed daylight, the Pessl Instruments pyranometer has favourable results compared to the first-class thermopile-type pyranometers but is priced at just a fraction of the cost.</p> <p>Sensor - LI-200SZ</p> <p>Calibration - Calibration against Kipp and Zonen CMP3 under daylight.</p> <p>Absolute error max. 5%, typically 3%</p> <p>Stability - 2% drift on 2-year use</p> <p>Time to measure - 10 μs</p> <p>Temperature dependency - 0.15% per °C</p> <p>Cosines correction - Sensor corrects up to 80° degrees</p> <p>Azimuth - 1% error over 360 degree at 45-degree elevation</p> <p>Operating temperature range - -20°C to 65°C</p> <p>Operating relative humidity range - 0 to 100%</p> <p>Sensor - Photodiode</p> <p>Housing - Weatherproof PAS case with acrylic diffuser, stainless steel hardware</p> <p>Size - 35 mm diameter, 45 mm height</p> <p>Weight - 114 g</p> <p>Evaluation - Pulse Wide Modulation 0-80% = 0-2000 W/m²</p> <p>Spectral range - 300-1100 nm</p>	
16	<p>Combined air temperature and relative humidity sensor</p> <p>Measures relative humidity and temperature with outstanding accuracy and repeatability. It has an integrated data acquisition and calibration history. Dew point, VPD and delta T calculations available.</p> <p>Temperature sensor - PT1000 1/3 Class B</p> <p>Humidity sensor -ROTRONIC Hygromer[®] IN-1</p> <p>Accuracy with standard adjustment profile at 23°C and 10, 35, 80 % rh ± 0.8% rh / ± 0.1 °C</p> <p>Accuracy with high precision adjustment profile at 23 °C and 10, 20, 30, 40, 50, 60, 70, 80, 90 % rh ± 0.5% rh / 0.1 °C</p>	

	<p>Resolution, AirChip3000 Typically 0.02 % rh, 0.01 °C Long-term stability < 1 % rh, 0.1°C / year Humidity response time t 63 - 3 seconds Measurement range - 0...100 % rh, -100...200 °C Electronics operating range -50-100 °C and 0-100 % rh Output signals Serial port RS485 Audit trail & electronic records FDA 21CFR Part 11 and GAMP compliant Power supply & consumption 3.2 V / 4 mA Housing/probe material Polycarbonate Filter Polyethylene insert, polycarbonate cage Standards CE-compliant 2007/108/EG</p>	
17	<p>Wind speed sensor - IM512CD is a cup type anemometer for low cost and long term, accurate wind measurements for all kinds of use. It calculates average wind speed in the specific time period. Range - 0 to 50 m/s, gust survival 60m/s Sensor - 12 cm diameter cup wheel assembly, 40 mm diameter hemispherical cups Turning Factor - 75 cm Distance Constant (63% recovery) - 2.3 m Threshold - 1.1 m/s Transducer - Stationary Coil Transducer Output - AC sine wave signal induced by rotating magnet on cup wheel shaft. 100 mVpp at 60 rpm. 6 Vpp at 3600 rpm Output Frequency - 1 cycle per cup wheel revolution. 0.75 m/s per Hz</p>	
#PAL2	Chain Node Interface	1 pc
1	External Box	
2	<p>Possible connections (up to 6 soil sensors):</p> <ul style="list-style-type: none"> - 1 Pessl Instruments sensor - 4 Watermark sensors - 1 soil temperature sensor 	
#PAL3	Chain Node Interface	1 pc
1	SDI12 Chain Node Interface	
2	<p>Possible connections (up to 2 soil sensors):</p> <ul style="list-style-type: none"> • Sentek Drill & Drop different types 	

#PAL4	<i>Soil Temperature Sensor</i>	<i>1 pc</i>
1	Temperature sensor The Soil Temperature Sensor is a PT1000 in a waterproof stainless-steel housing. The sensor output is a duty-cycle signal.	
2	Operating temperature range: -30°C to +75°C	
3	Supply DC Voltage (range): 4,57 – 7 V	
4	Accuracy: ±0.1 °C (-30 °C to +75 °C)	
5	Supply current max. 200 µA	
6	Calibration error max. 0.25 °C (23 °C)	
7	Long term drift max. 0.1 °C	
8	Data transmission: Rs 485 Digital signal (temperature data sent on demand of iMETOS main board)	
#PAL5	<i>Irrrometer Watermark Soil Moisture Sensor</i>	<i>1 pc</i>
1	Part	
2	Size: 2.2 cm diameter x 5 cm length	
3	Measuring Principle: Soil water tension correlated with electrical resistance in granular matrix	
4	Working range: 0 to 200 kPa	
5	Precision: 5%	
6	Evaluation: Analog	
7	Cable: 5 meters	
#PAL6	<i>Irrrometer Tensiometer</i>	<i>1 pc</i>
1	Part	
2	Instrument body materials - Butyrate body, ceramic tip, neoprene stopper	
3	Weight - 30 cm weights 0.439 kg. It increases 0.114 kg per 30 cm	
4	Ceramic tip - White tip – used for most soil types	
5	Operating suction - 0-90 kPa	
6	Operating temperature range - 0°C to 50°C	
7	Reservoir dimensions - Height: 120-130 mm including cap; Diameter: 51-55 mm including cap	
8	Body tube dimensions - Length: ranges from 15 to 90 cm	

	Diameter: 22 mm	
#PAL7	Soil moisture sensor	1 pc
1	Volumetric water content (VWC): <ul style="list-style-type: none"> - Range: 0–0.57 m³/m³ (0%–57% VWC) - Resolution: 0.0008 m³/m³ (0.08% VWC) in mineral soils from 0–0.50 m³/m³ (0%–50% VWC) - Accuracy: With standard calibration equation, 0.03 m³/m³ (3% VWC) typical in mineral soils that have solution electrical conductivity <10 dS/m NOTE: With soil-specific calibration, ±0.02 m ³ /m ³ (±2% VWC) is typical in any soil	
2	Dimensions: 16.0 cm (6.3 in) length; 3.3 cm (1.3 in) width; 0.8 cm (0.3 in) height	
3	Prong length: 10 cm (3.94 in)	
4	Operating temperature range: -40 to 50 °C	
5	Cable length: 5 m, 10 m	
6	Supply voltage (VIN to GND): <ul style="list-style-type: none"> - Minimum: 3.6 VDC at 12 mA - Maximum: 15 VDC at 20 mA 	
7	Measurement duration: Maximum 10 ms	
8	Temperature accuracy: ±0.3	
9	Output: Analog and digital	
#PAL8	Drill & Drop probe SE	1 pc
1	Probe lengths 60 cm (24") / 90 cm (36") / 120 cm (48")	
2	Number of sensors: 6-12 for each type of measurement placed at each 10 cm: 6-12x soil temperature, 6-12x soil moisture, 6-12x salinity (VAC)	
3	Outer Probe Diameter (Top-Bottom: 27-29.5 mm / 26-30 mm / 24.5-29.5 mm	
4	Moisture (VWC) range - Oven dry to saturation	
5	Method: Capacitance based technology	
6	Resolution: Moisture (VWC):1:10000	

	Salinity (Triscan) (VIC, Volumetric Ion Content):1:6000 Temperature: 0.3 °C	
7	Moisture precision: ±0.03 % vol.	
8	Temperature accuracy: ±2 °C at 25 °C	
9	Operating temperature range: -20°C to +60°C	
#PAL9	Single camera	1 pc
1	Sensors & lens: <ul style="list-style-type: none"> - Image Processor: Novatek NTK96660 high-performance processor - Image Sensor: 16MP Sony EXMOR R CMOS BSI image sensor - Lens: 70° Ultra-low distortion glass lens / F2.8 Aperture - G Sensor: High performance g-sensor 	
2	Display: 1,5" LCD display	
3	Size & Weight: <ul style="list-style-type: none"> - Dimensions: 59 mm x 30 mm x 41 mm (same as GoPro) - Weight: 64 g 	
4	Battery: <ul style="list-style-type: none"> - Rechargeable high-density lithium-ion battery (950mAh) - Up to 90 minutes of recording on 1080p 60fps - Charging through USB port 	
5	Ports: <ul style="list-style-type: none"> - Micro USB Port - Micro HDMI Port - Micro SD Card Slot 	
6	Storage: Compatible with Micro SD card (up to 64GB) Class 10 and above	
7	Connectivity: <ul style="list-style-type: none"> - WiFi (range: up to 100 m) - Bluetooth 4.0 (range: up to 10 m) 	
8	Video Format & Resolutions: <ul style="list-style-type: none"> - Video Compression Format: High-definition 	

	<p>H.264 image encoding</p> <ul style="list-style-type: none"> - Video Format: MP4 - Resolution: <ul style="list-style-type: none"> • 2160P @ 24 fps • 1440P @ 30 fps • 1080P @ 60/48/30/24 fps • 960P @ 60/48 fps • 720P @ 120/60/48 fps • 480P @ 240 fps 	
9	<p>Audio:</p> <ul style="list-style-type: none"> - Built-in microphone - External microphone supported 	
10	<p>Photo:</p> <ul style="list-style-type: none"> - 16 Megapixels - 4608 x 3456 Maximum resolution - 2 - 60s Time-lapse mode 	
11	<p>Features:</p> <ul style="list-style-type: none"> - External trigger through micro HDMI (RC servo PWM signal) - AV output - RAW output - Manual white balance - Gyro image stabilization 	
#PAL10	Multispectral-Camera	1 pc
1	Weight: Altum + DLS 2: 406.5 g (14.34 oz), Altum: 357 g (12.6 oz), DLS2: 49 g (1.73 oz), Wi-Fi Adapter: 2 g (0.07 oz), USB stick: 9 g (0.32 oz)	
2	Dimensions: 8.2 cm x 6.7 cm x 6.45 cm, (3.2 in x 2.6 in x 2.5 in)	
3	External Power: 4.9 - 25.2 V	
4	Power Input: 5.5/7.0/10 W (standby, average, peak)	
5	Spectral Bands: Blue, green, red, red edge, near infrared (NIR)	
6	RGB Color Output: High-resolution, global shutter,	

	aligned with all bands	
7	Thermal: LWIR thermal infrared 8-14um. Radiometrically calibrated	
8	Sensor Resolution: 2064 x 1544 (3.2 MP per EO band) at 120 m (400 ft) AGL 81cm per pixel (thermal) at 120 m	
9	Capture Rate: 1 capture per second (all bands), 12-bit RAW	
10	Interfaces: Aircraft: Trigger input, top of frame out, 1 PPS out. 3.3V isolated IO, 2x USB 3.0 SuperSpeed ports for WiFi or Ethernet and USB 3.0 Storage	
11	Field of View: 48° x 37° (multispectral), 57° x 44° (thermal)	
12	Focal length: 8 mm multispectral, 1.77 mm thermal	
13	Storage: USB 3.0 compatible storage devices	
#PAL11	<i>Handheld Crop Sensor</i>	<i>1 pc</i>
1	Key Benefits: <ul style="list-style-type: none"> - Addresses field variability - Determines fertilizer rates by using the current crop condition - Adjusts application rates automatically based on readings taken by the sensors as applicator travels through the field - Can often be used with existing rate control systems - Works in any weather condition—day or night - Easy to install, easy to calibrate, easy to use 	
2	Trimble Display Compatibility: <ul style="list-style-type: none"> - TMX-2050™ display - FmX® integrated display 	
3	The sensor emits brief bursts of red and infrared light and then measures the amount of each type of light that is reflected back from the plant	
4	The sensor continues to sample the scanned area as long as the trigger remains engaged	
5	The sensor displays the measured value in terms of an NDVI reading (ranging from 0.00 to 0.99) on its LCD display screen	

6	High-quality optical sensor to instantly measure plant vigor	
7	Easy-to-read display, even in sunlight	
8	Simple pull-type trigger and comfortable hand grip	
9	Micro USB charging port	

Annex 3: Commercial Offer

Note –

The Company must accomplish the commercial offer for equipment on its letterhead clearly showing the companies complete name and address.

To: EXOLAUNCH GmbH, address: Reuchlin Str. 10, 10553 Berlin, Germany

Commercial offer for the equipment supply within the framework of the project

***New and Innovative Courses for Precision Agriculture
(NICOPA)***

#NICOPA/12.08/2020/KZ “Invitation to Tender for Equipment Procurement - PAL-Set (Kazakhstan)”

Name of Company _____

PAL-Set

Item	Description	Quantity (pcs) for 1 University	Unit Price (EUR)	Total Price per item (EUR) for 1 University	Grand Total Price per item (EUR) for 3 Universities
1	2	4	5	6=4 x 5	7
#PAL1	Wireless solar panel and battery powered data logger	1			

#PAL2	Chain Node Interface	1			
#PAL3	Chain Node Interface	1			
#PAL4	Soil Temperature Sensor	1			
#PAL5	Irrrometer Watermark Soil Moisture Sensor	1			
#PAL6	Irrrometer Tensiometer	1			
#PAL7	Soil moisture sensor	1			
#PAL8	Drill & Drop probe SE	1			
#PAL9	Single camera	1			
#PAL10	Multispectral-Camera	1			
#PAL11	Handheld Crop Sensor	1			
Total Amount (Euro) excluding VAT					

Total amount in words (for 1 University):

Grand total amount in words (for 3 Universities):

If there is a discrepancy between words and figures, the amount in words shall prevail

Warranty conditions:

Delivery conditions:

Delivery period:

_____ days from the date of signature of the contract

Name _____

In the capacity of _____

New and Innovative Courses for Precision Agriculture

(NICOPA)

Invitation to Tender for Equipment Procurement - PAL-Set (KZ)

Signed _____

Duly authorized to sign the company for and on behalf of _____

Date _____

Stamp